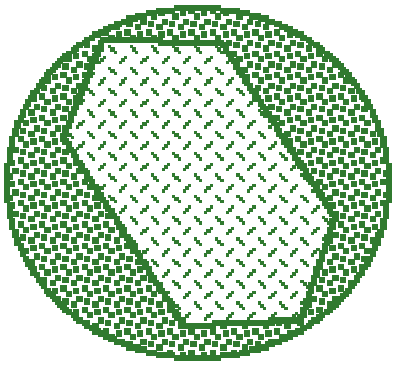

# On Track

*OnTrack: The Newsletter of the International Fission-Track Community*

**Volume 4, Number 2/Issue 9, November 1994**

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***In this Issue***



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## *EDITORS' NOTES*

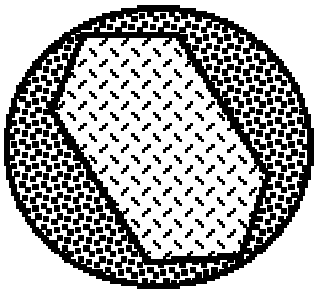
Featured in the this issue of *On Track* is a summary of events at the Eighth International Conference on Geochronology (ICOG8) held in Berkeley, California, USA, June 5-11, 1994. Like some of you, we were unable to attend the meeting so *Paul Fitzgerald* was asked to write up a summary of the meeting events for the rest of us (p. 3). This lead article highlights a number of current issues from standards to the state of the fission-track community and places them in context with ICOG8. Next, *Casey Ravenhurst* brings us up to date on the

activities of the Fission-Track Standards Committee that came together at ICOG8 (p. 5). *Barry Kohn* reports on the status of CN Glass Standards (p. 6) that were brought to our attention by *John Murphy* in the last issue of *On Track*. The discussion of fission-track standards in this issue of *On Track* is timely considering the recent arrival of "Results of interlaboratory comparison of fission-track ages for the 1992 workshop" (Miller, D. S. , Crowley, K. D., Dokka, R. K., Galbraith, R. F. , Kowallis, B. J., and Naeser, C. W., 1993, *Nuclear Tracks and Radiation Measurements*, v. 21, p. 565-573).

Also in this issue of *On Track , Dennis Arne* and the research group at Dalhousie University are offering their fission-track bibliography (p. 7) which contains nearly 3000 fission-track references! Additionally, *Richard Weiland* has compiled a short list of free computer applications specific to fission-track thermochronology (p. 8). In this last article, *Mark Brandon* suggests that an FTP (file transfer protocol) archive site could soon be a permanent storage and distribution center for fission-track programs available to anyone connected to the Internet.

We are thankful for all of the new papers, articles, and general information sent to us by the fission-track community. This issue of *On Track* practically wrote itself, all we had to do was compile the materials sent to us. Thanks again and keep sending us new material. Remember the next printing (issue 10) will contain the International Fission-Track Directory so please send us corrections, additions, and deletions before May, 1995.

You may ask yourself "Why does the University of Texas group feel the need to have three editors to produce the *On Track* newsletter?". Group or lab editorships have been suggested to reduce the work load required of a single editor in past issues of *On Track*. Hopefully the reduced workload will encourage all labs to eventually take on the editorship of *On Track* where they can show off their active research. Finally, multiple editorships provide students like ourselves the opportunity to gain a bit of exposure when first getting started.



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***On Track*** is a biannual newsletter of the inter-national fission-track community. It is printed in the months of May and November. The views expressed in *On Track* are those of the authors and do not necessarily reflect those of the fission-track community or the editor of *On Track*.



*On Track* will remain free, at least for the near future. However, to save costs we generally mail only one copy per lab so please be sure to pass *On Track* around your lab.

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***Trevor Dumitru*** (1991-92), Stanford University
***Rasoul B. Sorkhabi*** (1992-93)Arizona State University
***Dennis Arne*** (1993-94) Dalhousie University

***Acknowledgments***

We would like to thank the previous editor Dennis Arne who made the "changing of the guard" a painless process. Printing and mailing costs were paid for by a donation from Donelick Analytical, Incorporated and advertisements in this issue of *On Track.*

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## SUMMARY OF ICOG8 EVENTS

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ICOG8 was held on the Berkeley campus of the University of California, across the bay from the city of San Francisco from June 5 - 11. The cost of living is high in California and this was reflected in the registration (US$ 350, US$ 175 for students). However, the organization of this meeting was excellent from start to finish and most things proceeded smoothly. Morning and afternoon tea were served on time, and free beer (albeit American) followed at the conclusion of each days' events. While it may have been hard to move from talk to talk in different sessions, this is, in my experience, a complaint common to most large meetings, as is the scheduling of talks. Even though Murphy was not present, his law states that the two talks you most want to see out of hundreds presented will be scheduled at the same time. About 750 abstracts were submitted to the meeting, approximately 40 of them dealing primarily in fission tracks. The opening ice breaker function was a wine tasting affair with a large collection of excellent California wines from the nearby Napa and Sonoma Valleys.

Plenary (keynote) talks were given in the morning, with other 20 minute talks in theme sessions following that and lasting all day, and a big poster session in the afternoons, except Wednesday afternoon which was free. Monday morning started with a bang as the respective directors of IHO (Institute of Human Origins) whom most of us thought were the organizers

of this meeting, and the newly resurrected BCG (Berkeley Center for Geochronology) aired their political underwear as a result of a split in IHO about a month prior to the meeting. The facts of this split were not clear to me, but apparently involved that incurable disease, EGO (see the May 27, 1994 issue of Science). The unfortunate fallout of this lack of inoculation was that the lab tours at IHO-BCG were canceled as the labs were locked up almost all week. A court injunction by BCG was successful in freeing the shackles late in the week and lab tours were held Friday night and Saturday morning. A representative for the Secretary of the Interior informed us that the USGS (U.S. Geological Survey) was going to lead us (isotope geologists and geochronologists) forward into the 21st century. Members of the USGS would have been delighted to hear this, but unfortunately there were very few present owing to the low level of funding to the USGS. Politics dealt with, we moved on with the more realistic (and non-political!) business of science.

Monday was a day short on talks containing any information on tracks, with only one talk on relating hydrothermal fluid flow to thermal maturity using fission tracks and fluid inclusions. In a session on Thermochronology-Applications on the Tuesday morning, two excellent FT talks were given on the Rhine graben and southeastern Spain. These were contrasted in that same session by several generally abysmal $^{40}Ar/^{39}Ar$ application talks. It became apparent that, in general, fission trackers make good slides, give good talks, take fieldwork and geology into account, and do not have "excess tracks" to confuse the interpretation of data. This was further emphasized in the Tuesday afternoon poster session which contained the bulk of presentations dealing with the application of fission tracks. The quality of posters and science was excellent, it is obvious that some in the FT community are frustrated artists. It was also clear that there is a good understanding (and consensus) in how to interpret data, and how to judiciously use modeling to enhance the interpretation. Unfortunately, there were so many posters that even in the three hours or so for viewing them, there was not enough time to do them all justice, as this session also contained the bulk of thermo-chronology posters using other methods. Fission track posters were given on constraining the timing of thrust faults, uplift histories, accretionary complexes, core complexes and mylonites. There were presentations on obsidian as an age standard and zircon annealing. Many FT posters focused on areas in Europe: the Bay of Biscay, the western and central Alps, the Transylvanian Basin-Carpathian belt in Romania, Hungary, southern Spain, southern Italy, southern Norway as well as East Greenland. Posters were presented on areas adjacent to past and present extension: southeastern Australia (2), Papua New Guinea, Transantarctic Mountains (2), Red Sea, southwest Africa and Tanzania. There were also presentations about the "high" plains of southeastern Australia (nothing is high in Australia!), northern Alaska and thermal spikes near the San Andreas fault.

At a meeting impeccably chaired by a former inhabitant of God's own country, Barry Kohn, most of the fission trackers met on Tuesday night to discuss a number of topics. I imagine these will be discussed elsewhere in *On Track*, but the highlights were: [1] Dave Coyle, on behalf of the European fission-track community announced that the next fission-track meeting will be held in Gent, Belgium, most likely in late August or early September 1996. This is the home of Peter van den Haute and his lab, but the European FT groups will jointly organize the meeting. The point was made that this meeting should perhaps be more of a workshop (informal, with posters) rather than a mini-conference. Other suggestions, such that the theme of the workshop should be "new directions" with emphasis on modeling, and hands-on access to computers flowed freely. [2] Standards - there was some concern over the present age standards (Fish Canyon, Durango, Mt. Dromedary) being "too easy" and that there were no complex reference age or length (i.e., with short lengths, bimodal distributions)

"standards". The question of new zircon and sphene age standards was also raised. This discussion went on so long that an "ad hoc" committee was "ad hocally" appointed with a large component of fission-track people who have feet in both the FT and argon camps as the argon world is currently developing new standards and refining old (e.g., Fish Canyon Tuff). "Elected" were Casey Ravenhurst (chair), Dave Coyle, Dave Foster, Bob Walters, and Taka Tagami. [3] Corning glass standards CN1, CN2, CN5 - after a presentation by Barry and general agreement that these should not slip through our hands, the La Trobe FTRG and London FTRG agreed to jointly purchase these from Corning. There is a good supply of these for the foreseeable future. [4] NAFTA - North Atlantic FT Alliance - this is an idea stemming from a proposal submitted by the Dalhousie group for a geodynamic approach to compare, contrast, communicate data about the conjugate North Atlantic margins (reflecting post-Hercynian uplift). Many groups in North America, the UK, and Europe (as well as down under at La Trobe) have been working around the North Atlantic margins. For groups working in Antarctica, AFTA$^{TM}$ (Antarctic FT Alliance $^{\text{Transantarctic Mountains}}$) has yet to be formally launched, but could potentially include members from the US, UK, Italy, Australia, New Zealand, and Germany, should the cell be large enough to hold us all. [5] *On Track* - most people were happy with it the way it was. Past editors told us a few horror stories, but despite this Ruth Siddall (London) volunteered herself as a potential candidate to be the next editor.

Thermochronology; Theory and Experimental on Wednesday morning (only a half day session) included three FT talks which dealt with bulk etch rate of tracks in Durango, annealing of tracks in zircon and one to one correlation of tracks between sphene and mica external detectors. An observation made by many was that the number of talks versus the number of posters was out of proportion compared to other disciplines. There were 10 FT talks vs. 30 posters. This compared to 39 talks versus 31 posters (approx. figures) for $^{40}Ar/^{39}Ar$. Judging from the quality of the 6 FT talks I saw compared to a number of other talks, the scientific organizing committee could have done themselves, the conference, and the audiences a great service if they have had more FT talks. The four FT talks on Friday were about recent sphene data from the KTB hole, genetic algorithms for forward modeling FT data which breed as the model progresses, laboratory annealing data using confined lengths in zircon, and AFT morphotectonics of the Snowy Mountains using the concept of exhumed PAZs and GIS.

There were strong contingents from both Australia (La Trobe) and the UK (London) attending ICOG8, with 9 presentations from each lab. The European FT community also had a large presence with 8 presentations, although there was a complete lack of fission trackers from France. Japanese labs had 6 presentations, Canada two, and there was one from Vietnam. Despite being the host country, US labs only had 4 presentations, and two of those were on Antarctica. In general this reflects a rather sorry state of fission-track labs in the US; all the apparently productive labs are run by students and/or people on soft money. In comparison, Australia, UK, Europe, Canada, and Japan have a permanent nucleus in each lab. There were 11 presentations on FT applications in Europe, clearly it is the most popular place to do fission-track analysis. England is obviously the least desirable place to do fission-track analysis as there were no talks on data from England, yet there were so many people from the London lab.

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## FISSION-TRACK STANDARDS COMMITTEE

*Casey E. Ravenhurst*
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I was elected chair of the Fission-Track Standards Committee at ICOG8. The committee will attempt to prepare a set of standards and reference material for distribution either before or at the 1996 Fission-Track Workshop in Gent, Belgium.

### Minutes Of 1st Meeting - June 10, 1994

All members were in attendance: Casey Ravenhurst (chair), Dave Foster, Dave Coyle, Robert Walker, Takahiro Tagami, Hideki Iwano. Also in attendance were: Barry Kohn, Andy Gleadow and Tony Hurford.

A. ESTABLISHED 2 CATEGORIES OF MATERIALS

1) Age standards - apatite, zircon, sphene (titanite) and glass that have been calibrated with other geochronological techniques.

2) Reference material - apatite, zircon, sphene and glass samples that have had somewhat complex thermal histories and can be used to intercalibrate techniques between labs and for training novices.

B. AGE STANDARDS - Tony Hurford offered to compile a list of the currently existing apatite and zircon age standards.

- apatite: no new samples for use as age standards were suggested.

- zircon: 2 new possibilities were suggested by T. Tagami but funding is needed to collect large quantities of them.

- sphene: D. Coyle suggested that Fish Canyon Tuff (FCT) sphene would make a decent age standard because in his experience it contains more tracks than FCT apatite.

- sphene: D. Foster suggested the Peach Springs Tuff near Kingman, Nevada (18.5 + 0.2 Ma by 40Ar/39Ar in four different labs: Neilson et al. did bulk analyses with D. Lux in Maine, USA and single grain laser work with Dalrymple in Menlo Park; D. Foster did single crystal dating in Albany, NY; and B. Turin did single crystal work in Berkeley).

- sphene: A. Gleadow and D. Foster suggested Mount Cole, S.E. Australia (a shallow level intrusion, ~400 Ma by $^{40}Ar/^{39}Ar$ by D. Foster and Sue Kay). Sphene from this sample was analyzed by A. Gleadow some years ago and was of very good quality.

C. REFERENCE MATERIAL - no synthetic material will be produced; we should be able to find adequate natural samples (not large museum specimens).

- ideally we need a sequence of samples through the boomerang (or banana) trend on age vs. length graph.

- suggestions included a La Trobe apatite lab suite, a zircon sample provided by T. Tagami, some Otway Basin samples.

D. ETCHING PROCEDURES - along with the age standards and reference materials we need to suggest a common etching procedure or at least make careful records of the etching procedures used in each lab (acid strength, temperature, length of time, and post-etch steps).

**Developments Since The Meeting:**

1) JAS-G1 (Japan Age Standard - Glass no. 1) sent by Kiyoshi Wadatsumi and Naoko Kitada to a number of fission track labs. This sample has a recommended age of 0.945+0.005 Ma ($^{40}Ar/^{39}Ar$ isochron method) and is being proposed as a new international age standard for fission-track dating of glass. Information on this sample was presented at the ICOG8 meeting. If you wish to obtain some of this glass sample and join the effort to establish this new age standard, please contact one of the above sponsors at:

Department of Geosciences
Osaka City University
3-3-138 Sugimoto
Sumiyoshi-ku , Osaka 558
JAPAN

TEL: 81-6-605-2593
FAX: 81-6-605-3071
E-mail: h1602@ocugw.cc.osaka-cu.ac.jp (Kiyoshi Wadatsumi)
E-mail: h1724@ocugw.cc.osaka-cu.ac.jp
(Naoko Kitada)

2) D. Foster et al. separated sphene from a hand sample of the Peach Springs Tuff and it is now back from the reactor.

3) D. Foster collected a large amount of granodiorite from Mount Cole which is now being separated.

4) D. Foster et al. are processing a sphene separated from the $^{40}Ar/^{39}Ar$ flux monitor/age

standard MMHb-1 to check its quality.

**Further Ideas Since The Meeting:**

We need not only F-apatites but also Cl-apatites and OH-apatites as reference material in order to work out common etching and measuring procedures.

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## CORNING GLASS DOSIMETERS UPDATE

*Barry Kohn*
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Further to John Murphy's announcement in the last issue of *On Track* regarding the future of the Corning (CN) Glass standards, the following steps have now been taken.

The fission-track participants at ICOG8, Berkeley held a meeting where it was unanimously agreed that in light of Dr. Schreur's imminent retirement a continued supply of Corning glass standards was vital for the needs of the fission-track community. The La Trobe and London fission-track laboratories agreed to buy up the remaining supplies of CN-1, CN-2 and CN-5 glasses and sell them on a cost recovery basis. In addition to purchasing existing wafers (cut at 1 mm thick), it was also decided that the remaining standard glass blocks be cut into wafers of 2 mm thickness.

Purchase has now been completed and stocks have been divided equally between the two laboratories. The supply of glasses to fission trackers will be based on geographic location: The La Trobe laboratory to Oceania, Asia, the west coast of North America (Texas and to the west) and South America; and the London laboratory to Europe, east coast of North America, Africa and the Middle East.

The wafers are available in roughly two different sizes.

**CN-1** 28 x 26 x 2 mm, *****18 x 18 x 2 mm, or 26 x 24 x 1 mm

**CN-2** 24 x 28 x 2 mm or 24 x 24 x 1 mm

**CN-5** 18 x 15 x 2 mm or 25 x 15 x 1 mm

The smaller size wafers will yield about four standard glasses, while the larger will yield about six. This difference is reflected in the pricing of the wafers which will cost US$ 40 for the smaller wafers and US$ 60 for the larger wafers (i.e. US$ 10 per standard).

To place orders or for more information contact:

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La Trobe University
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TEL: 61-3-479-1516 (office)
or 61-3-479-3517 (lab)

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Dr. Tony Hurford
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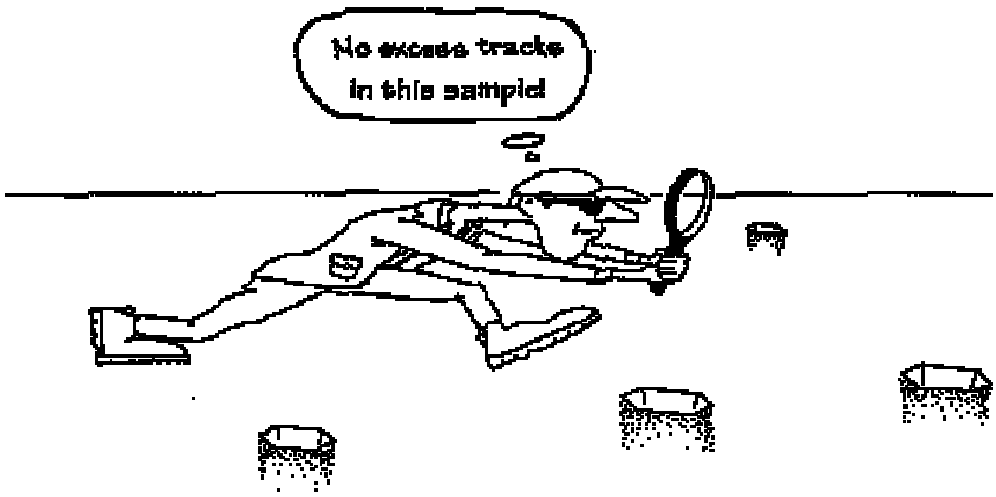
or 44-71-387-7050 x2418
FAX: 44-71-388-7614
E-mail: ucfbajh@ucl.ac.uk (Tony Hurford)

(*****This size is only available from La Trobe)

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**FISSION-TRACK BIBLIOGRAPHY AVAILABLE**

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The Dalhousie University Fission Track Research Laboratory has recently up-dated its fission-track bibliography first offered for the 1992 Mineralogical Association Short Course on low-temperature thermochronology. Our latest version is available as an End Note document containing more than 700 entries, as well as in Microsoft Word 5.1 (for Macintosh) and Word Perfect 5.1 (for DOS) formats. We will also supply the previous bibliography containing 2250 references on either DOS or Macintosh-formatted disks current to early 1991.

The listings have been compiled from a variety of sources, including GEOREF, *On Track*

and personal libraries. Note that the references do not supersede GEOREF and provide only limited information. *These references are provided for educational purposes only*.

Anyone interested should write to:

Greg Pemberton

c/o Fission-Track Research Laboratory
Department of Earth Sciences
Dalhousie University
Halifax, Nova Scotia
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Please send an international bank draft or money order for **CAN$ 25** to cover the cost of disks, postage and handling. Make the draft or money order payable to Dalhousie University. Specify DOS or Macintosh format and whether you want the most recent bibliography as an End Note, Microsoft Word or Word Perfect 5.1 file.

End Note is a reference database and bibliography maker for Macintosh System 4.2 or higher. It is marketed by Niles & Associates, Inc., 2000 Hearst St., Berkeley, CA 94709, USA.

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**SHORT TRACKS: NEWS**

*Dennis Arne* will leave Dalhousie University in Canada at the end of this year to take a lecturing position at the Department of Geology, School of Science, University of Ballarat, P. O. Box 663, Ballarat, Victoria 3353, Australia.

*Sara Burns* recently started her M.A. degree at the University of Texas at Austin, Department of Geology Sciences. She will be applying apatite and zircon fission-track thermochronology to igneous rocks along the central California coast that were generated during the northward migration of the Mendocino triple junction.

*Raymond Donelick* was recently appointed Adjunct Professor at Rice University, Houston, TX and has a 16 month old son named Andrew by his wife Margaret (Burke) Donelick.

*Dan Kendrick* , a recent University of Utah M.S. graduate, has moved to Australia to pursue a Ph.D. at La Trobe University. He is applying apatite fission-track thermochronlogy in the New Guinea foreland and Lengguru fold-and-thrust belt of Irian Jaya, Indonesia.

*M. Lal, K. D. Bal and R. S. Waraich* have set up a new fission-track lab at the KDM Institute of Petroleum Exploration in Dehradun, India.

*Jon Linn* is a Ph.D. candidate at the University of Kansas and part time fission-track lab user at the University of Texas at Austin where he is applying the fission-track method to Sevier belt rocks in east-central Utah.

*Casey Ravenhurst* has moved from Dalhousie University, Canada to the University of Massachusetts in Amherst, U.S.A. where he has recently been appointed Adjunct Professor.

*Mary Roden* recently married and changed her name to *Mary Roden-Tice*. Mary has also been appointed Assistant Professor at SUNY Plattsberg, Plattsberg, NY, USA where she plans to

set up a new fission-track lab.

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## 7TH INTERNATIONAL WORKSHOP ON FISSION-TRACK THERMOCHRONOLOGY

Results from the 1992 interlaboratory comparison of fission-track age and length data for the 7th International Workshop on Fission-Track Thermo-chronology are hot off the press in *Nuclear Tracks and Radiation Measurements* (Miller et al., 1993, v. 21, p. 565-573). Abstracts from the meeting's presentations are also printed in the same volume on pages 583 to 630.

## 8TH INTERNATIONAL WORKSHOP ON FISSION-TRACK THERMOCHRONOLOGY

Rumor has it that the 8th International Workshop on Fission-Track Thermochronology will be held in Ghent, Belgium, possibly in late August or early September, 1996. Stayed tuned for more information in upcoming issues of *On Track*!

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## AVAILABLE FISSION-TRACK SOFTWARE

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Several spectacular commercial software packages are available for the collection and analysis of fission-track data. However, there is also a growing number of programs that can be obtained for free or for minimal materials and mailing costs. In this article I provide short descriptions of the FREE fission-track programs of which I am aware, reference to more extensive descriptions, and information on how to get your own copies. Although all of the software described in this article is free, I refrain from using the term "freeware" because it implies that the software was originally written for public distribution which was not some of the authors' original intent. Fortunately, all of the authors mentioned here have decided to make their programs available to the fission-track community free of charge.

This article is an attempt to reduce the effort that each lab or student goes through writing programs when such high quality programs are readily available. Additionally, *Mark Brandon* has informed me that an FTP archive site for fission-track programs is available through at "milne.geology.yale.edu" which is open to everyone on the network. A second FTP archive site dedicated to fission-track programs may also be set up at "gilbert.geology.yale.edu" on *Mark Brandon's* work-station. Although I have not discussed this with any of the authors of programs mentioned in this article, I encourage them to consider storing a copy their program and documentation at one of the FTP archive sites listed above. In this way, the fission-track community could access the programs at any time. Until then, I suggest that requests for programs be sent to the authors with a properly formatted diskette and a postage-paid, self addressed diskette mailer.

**OmniTrack** (Ketcham, R. , May 1993 issue of *On Track*.) is a computer program for

collecting fission-track thermochronologic data from an integrated Macintosh(TM) computer, Kineteck(TM) motorized microscope stage, and digitizing tablet. Fission-track "counts" are registered with the keyboard or mouse and track length data are entered from a digitizing board. Besides storing all of your fission-track data, OmniTrack calculates fission-track ages, statistical tests, and produces histograms of age and length data which can be exported to graphics programs. The advantages with this integrated fission-track software (and any of the commercial systems) is that (i) it saves time by determining the location of corresponding induced fission tracks on the external detector for each grain analyzed, (ii) drives to the location with the touch of a button, (iii) has an automated scanning system, (iv) has an easy to use graphical user interface, and (v) is a great teaching aid for new fission-trackers. OmniTrack was written in the Symantec(TM) THINK C(TM) programming language for Macintosh(TM) computers. The program was first offered to outside labs in 1992 during the fission-track workshop in Philadelphia (U.S.A.). The software including source code is free through the author, *Richard Ketcham* at the University of Texas at Austin, Department of Geological Sciences, Austin, Texas 78712, U.S.A., E-mail: richk@maestro.geo.utexas.edu.

**AFTINV 1.0 and AFTINVCOOL 1.0** (Corrigan, J., 1991, Inversion of apatite fission track data for thermal history information: *Journal of Geophysical Research*, v. 96, p. 10347-10360) are inverse modeling programs that produce thermal histories compatible with apatite fission-track cooling ages and track length distributions. Using the Carlson (1990, American Mineralogist, v. 75, p. 1120-1139) model for the kinetics of fission-track annealing in apatite, AFTINV produces not one *T-t* curve but up to 250 acceptable *T-t* curves on one plot and a probability distribution of temperatures experienced by the sample at different times on a second plot. Acceptance of thermal histories is based on objective functions that compare observed and calculated track length and age data. AFTINV and AFTINVCOOL were written in FORTRAN for Macintosh(TM) computers with both a 680x0 processors and a 68881 math coprocessors. Graphical output is obtained using MATLAB(TM). For more details see the above reference. This program is free and can be obtained through the author, *Jeff Corrigan*; day TEL: 214-509-4090 (U.S.A.), E-mail: dprjdc@arco.com.

**LENMODEL** (Crowley, K. D., 1993, *Computers in Geosciences*, v. 19, p. 619-626) is a forward model for calculating length distributions and fission-track ages in apatite. After the user chooses one of the three annealing models in the program, a thermal history is chosen which the program approximates by a series of isothermal "heating" steps of varying duration. Fission track production and annealing are calculated for each isothermal step and summed to provide an final cooling age and track length distribution. LENMODEL was written in BASIC and assembler for PC-compatible computers running on DOS(TM) 3.0 and higher or Windows(TM) 3.0 and higher. The program also runs on Macintosh(TM) computers with the program SoftPC Professional(TM). For more details see the November 1993 issue of *On Track* and the above reference. To obtain a copy of the program send a written request and a self-addressed, postage-paid diskette mailer (do NOT include a diskette) to *Kevin D. Crowley*, Board of Earth Sciences and Resources,

National Research Council, 2001 Wisconsin Ave., NW, Washington, D.C. 20007, U.S.A. Note the code used in LENMODEL is being used to develop FTINVERT, an inverse model designed that produces time-temperature histories for measured apatite fission-track ages, densities, uranium concentrations, and track length distributions. "Beta" version of this program are available. For more information about FTINVERT contact *Kevin Crowley* by E-mail (kcwowley@nas.edu) or at the address listed above.

**ThermalView** is an up and coming program by *Dave Coyle* which will allow the user to

draw time-temperature curves with "more or less real-time feedback" of the derived apatite fission-track length and age data. As soon as the user draws or adjusts an existing thermal history in the designated time-temperature space (window), the program calculates the fission-track data at low resolution (~20 tracks). Once the user stops drawing or altering the curve, the application calculates the fission-track data at a higher user-defined resolution (at least 200 tracks/ steps). *Dave* tells me the program will smooth thermal histories using a bezier curve function, have color graphics, and all the neat stuff that comes with higher end programs. At present the program runs but is in the "pre-beta" development stage. It will be available free of charge as soon as testing is complete. The program is multi-platform application (NeXTstep) so it will run on PC's, MAC's, and in WINDOWS(TM). For more information about ThermalView contact *Dave* at tracks@weizen.rt.schwaben.de.

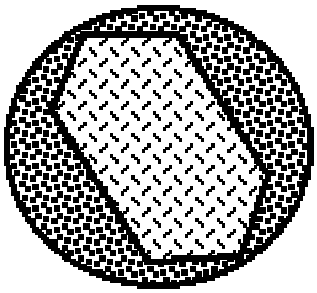
**Radial Plot** (J. Talbot, unpublished) is a computer program for the graphic presentation of single grain fission-track ages which invariably have different standard errors due to differences in uranium concentration, counting area, provenance age, and "degree" of annealing. Radial plots are a tool for evaluating the potential for multiple age components with in a single sample fission-track analysis and for comparing the "scatter" between different data sets (i.e. samples or irradiations). The counting data is entered as a spreadsheet and plotted along an X (% relative error, i.e. precision), Y (standardized estimate), and radial scale (age). Grains with no spontaneous tracks (i.e. Ns = 0) are not plotted but their absence is indicated in the lower portion of the graphic. The *Plot Options* window allows the user to specify the values plotted along the X and Y scales for comparison of different samples, change data point label size, and change data point symbols. Although usually not needed, the graphics are easily exported into other graphics programs for further alteration. *Radial Plot* was written in THINK Pascal(TM) for Macintosh(TM) computers by *James Talbot* and is based on the statistical work of Galbraith (1988, *Technometrics*, v. 30, p. 271-281.). It is free and available through the author, *James Talbot* at 1709 Overlook Drive, Grapevine, Texas 76051, U.S.A., TEL: 817-481-5801.

The "**Gaussian Peak-Fitting Program**" (Brandon, M., 1992, *American Journal of Science*, v. 292, p. 535-564.) decomposes a fission-track grain age distribution from an individual sample into a group of component grain age distributions. Fission-track ages are plotted in a histogram where a composite probability density curve is fit to the data. The composite probability density curve is then decomposed into a set of component probability density curves. Each component probability density curve is assumed to represent a single population of grains with a Gaussian distribution, unique mean age, relative standard deviation, and estimated number of grains in the component distribution. The program was principally designed for the analysis of zircon fission-track data which have inherently higher spontaneous track densities. Presumably, apatite fission-track age data could also be used if enough fission tracks exist (~9 spontaneous and ~9 induced) in each grain analyzed for the Poissonian statistical analysis used. The program is written in Microsoft(TM) Professional BASIC for PC-compatible computers. For more information refer to the above referenced article. The program is available in an executable form and also as source code. To obtain a free copy of the program send a DOS formatted 3.5 or 5.25 inch diskette to the author, Mark T. Brandon, Department of Geology and Geophysics, Yale University, P. O. Box 6666, New Haven, Connecticut 06511, U.S.A.

Described above are the FREE computer programs available to the fission-track community. I am sure there are many more programs of which I am unaware. If you have a program that might be of interest to the fission-track community and are willing to share it, please send me a paragraph or more describing the program for publication in *On Track*.

Remember that although the above mentioned programs are highly sophisticated, none of the authors claim them to be error free or suitable for all applications. None of them come with guarantees. The user is solely responsible for numerical information, graphics, and subsequent interpretations generated directly or indirectly by the use of these programs. That aside, the above mentioned programs are a bargain in terms of time and money. I am sure any of the authors would be happy to see their programs more widely used and tested by the fission-track community.

In the next issue of *On Track,* I will have more information on the FTP archive site(s) for fission-track programs and possibly more FREE programs.



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**CALL FOR CONTRIBUTIONS TO THE MAY 1995 *ON TRACK* ISSUE 10**

Dear Fellow Fission Tracker:

The next issue will come out in May 1995 and **we are looking for contributions.** We welcome contributions of virtually any kind, including descriptions of new lab techniques, reviews of useful products, news and gossip, raving editorials about what all the other labs are doing wrong (or right), corrections of errors that appeared in the previous issue, meeting announcements, job openings, cartoons, and descriptions of what you are doing in your research. If you would like to contribute, send the final text and figures before the **DEADLINE, May 1, 1995**. If it is a lengthy article, let me know the title and length as soon as possible.

Please send a paper copy of your contribution and a 3.5 inch **Macintosh(TM) compatible disc** with the text saved in Microsoft Word. If you can't send a Macintosh compatible disc, send a 3.5 inch IBM compatible disc in Word, or WordPerfect. Contributions can also be sent electronically.

*On Track* always includes a list of **Recent Fission-Track Papers**. If you know of a paper that was published recently, or that is in press and should be published in the near future, please send it in. The **Short Tracks: News** section allows all of us to keep up with fission "trekking" around the globe. If you don't want to be maligned, please keep me informed. Much of the information I received for this section in this issue was second hand! I tried to check all of it, honestly! *On Track* also includes an **International Fission-Track Directory** in each May issue. If you are about to move, have moved, or know of someone who has moved, please inform me so the directory can be updated. Send all contributions for the next issue of *On Track* to:

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## RECENT FISSION-TRACK PAPERS

*Please send items for future listings in On Track to the editor. The reference or a photo copy of the first page will suffice but a copy of the entire paper is appreciated. We especially want non-fission-track papers that may be of special interest to the fission-track community. Papers in press are welcome, please include an estimate of the expected month of publication.*

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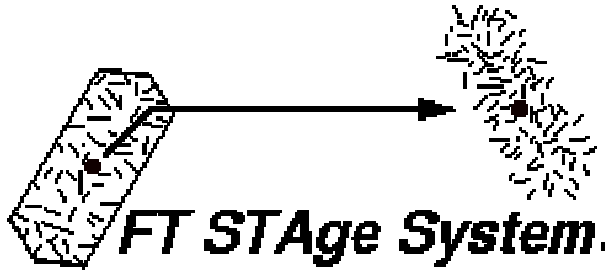


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*Kent State University, Kent, Ohio, installed in 1993
*University of Wyoming, Laramie, Wyoming, installed in 1993
*University of Arizona, Tucson, Arizona, installed in 1993
*Max-Planck-Institut, Heidelberg, Germany, installed in 1993 using a preexisting stage
*Union College, Schenectady, New York, installed in 1994
*Monash University, Melbourne, Australia, installed in 1994 using a new Zeiss stage
*La Trobe University, Melbourne, Australia, installed in 1994 using two new Zeiss stages
*University of Pennsylvania, Philadelphia, Pennsylvania, installed in 1994.

***Detailed Information:***

The system is described in a paper in Nuclear Tracks and Radiation Measurements, vol. 21, p. 575-580, Oct. 1993 (proceedings issue for the 1992 Workshop on Fission Track Thermochronology held in Philadelphia).

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